



Resident Forum

# Trichoscopy basics: Tinea capitis revisited!

Anshuman Dash<sup>1</sup>, Shikha Bansal<sup>1</sup>

<sup>1</sup>Department of Dermatology and Sexually Transmitted Diseases, Vardhman Mahavir Medical College and Safdarjung Hospital, Delhi, India.



**\*Corresponding author:**  
Anshuman Dash,  
Department of Dermatology  
and Sexually Transmitted  
Diseases, Vardhman Mahavir  
Medical College and Safdarjung  
Hospital, Delhi, India.  
anshu.sipun@gmail.com

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## INTRODUCTION

Dermatophytoses or cutaneous fungal infections caused by dermatophytes have multifarious clinical manifestations. India is facing an epidemic-like scenario of dermatophytosis.<sup>[1]</sup> Tinea capitis (TC), or dermatophytosis of the scalp predominantly affects children; however, there has been a growing number of reports documenting its occurrence in adults.<sup>[2]</sup> Trichoscopy has emerged as a valuable bedside tool for clinicians in diagnosing patients with hair-loss and inflammatory scalp lesions, including TC. Herein, we describe the trichoscopic findings in various subtypes of TC.

## EPIDEMIOLOGY

The epidemiology of TC varies greatly in different geographical locations across the world. The predominant organisms responsible are *Trichophyton* and *Microsporum* spp. The species vary across India, with *Trichophyton violaceum* common in Northern states, *Trichophyton mentagrophytes* in hilly areas, and *Trichophyton rubrum* in the southern part of the country.<sup>[3-5]</sup> The most common age group affected is 3–7 years.<sup>[6]</sup>

## CLINICAL PATTERNS

Immediately after the transfer of fungal spores from one infected host, the spores adhere to the hair keratinocytes strongly. Depending on the species, the hyphae produce spores on the surface of the hair cortex (ectothrix) or within the hair cortex (endothrix). The two predominant types of TC described are inflammatory and non-inflammatory. Kerion, favus, abscess, and pustular forms are the inflammatory variants. Black-dot, gray-patch, seborrheic, alopecia-areata-like, and the glabrous type (adult TC) are the non-inflammatory variants. A 10%-potassium hydroxide (KOH) wet mount from plucked hair can reveal ectothrix or endothrix. The gold standard remains fungal culture where species identification is an added advantage. The sensitivity of KOH mount has been reported to be close to 50%.<sup>[7]</sup> However, sample collection, the examiner's expertise, and disease severity may influence the KOH mount results. Culture is not always feasible and time-consuming. Trichoscopy is an easy bedside test that can be performed in all cases of suspected TC with high sensitivity and specificity (94% and 83%, respectively).<sup>[7]</sup> Since its first use by Slowinska *et al.* in the description of two cases of TC caused by *Microsporum canis*, numerous reports and studies have been published, reinforcing its utility in the diagnosis of TC.<sup>[8]</sup> Moreover, it can also be used for monitoring patients on treatment.

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## TRICHOSCOPIC SIGNS IN TC

An illustration [Figure 1] depicts the various trichoscopic findings associated with TC.

### Comma-shaped hairs

These are short, c-shaped hairs resembling the punctuation mark, comma. Fungal hyphal invasion causes the hair shaft to weaken with subsequent bending and fracture giving rise to the characteristic comma shape.<sup>[8]</sup> It has been reported to be the most common finding in many studies and is associated with both endothrix and ectothrix infections.<sup>[9-11]</sup> It can be occasionally seen in alopecia areata and trichotillomania as well.

### Corkscrew hairs

These are specific forms of comma-hair in the shape of a corkscrew, first described in African-American children.<sup>[12]</sup> Later on, these were found to be present even in white-skinned patients and Indians. It is a highly specific and sensitive marker for TC and is associated with endothrix infections more commonly than ectothrix.<sup>[8]</sup> [Figure 2].

### Black dots

They represent broken or dystrophic hairs in TC that are fractured just at the level of emergence from the scalp. These are important as markers of disease activity but are non-specific, and commonly seen in alopecia areata and trichotillomania.

### Morse-code-like hairs

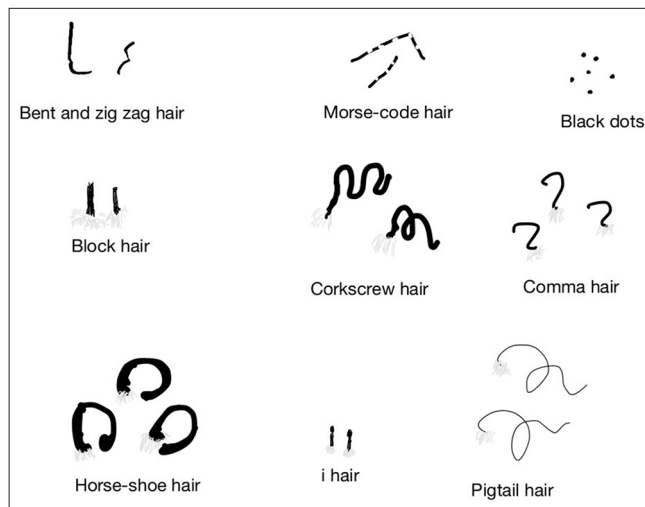
Also known as bar-code hairs, these are represented by multiple thin white bands or sheaths across the hair shaft. They are formed due to the presence of fungal colonies causing transverse perforation of the hair shaft.<sup>[8]</sup> It is considered very specific for ectothrix infections, particularly by *Microsporum* spp.<sup>[13]</sup> [Figures 2 and 3].

### Zigzag hairs

Several incomplete transverse fractures across the hair shaft give rise to hairs with multiple acute angle bends forming a “Z” shape. They have been reported more commonly with ectothrix infections, although some studies from India have detected them in endothrix as well<sup>[8,14]</sup> [Figure 3].

### Bent hairs

These are hairs where there is bending of the hair shaft with homogeneous pigmentation.<sup>[7]</sup> In contrast to comma hairs, the length of the hair remains normal. These are also more frequent in ectothrix.



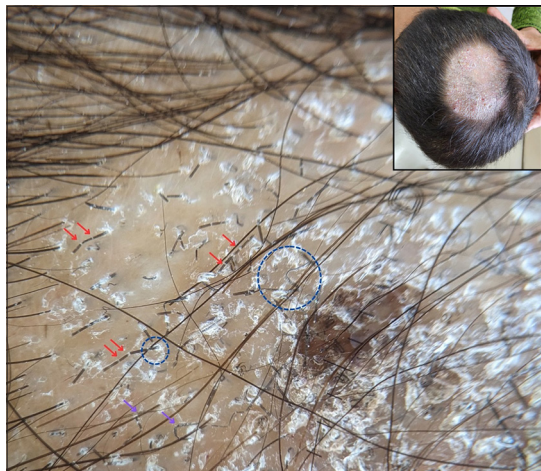
**Figure 1:** An illustration depicting various trichoscopic signs in tinea capitis.



**Figure 2:** Trichoscopy showing corkscrew hairs (orange circle), horse-shoe hair (blue circle), Morse-code hair (red arrow), and block hairs (blue arrows). The inset shows the clinical image of the same patient (x20, DermLite DL5, polarized, contact, dry).

### Block hairs

These are dystrophic short hairs with a horizontal distal end seen in the endothrix<sup>[8]</sup> [Figure 2].



**Figure 3:** Trichoscopy showing diffuse and perifollicular scaling (blue circle) along with Morse-code hairs (red arrows) and zigzag hairs (purple arrows). The inset shows the clinical image of the same patient ( $\times 20$ , DermLite DL5, polarized, contact, dry).

### “i” hair

Block hairs that have a prominent distal end, resembling the English alphabet, “i” are designated as “i” hairs.<sup>[15]</sup> Apart from TC, both block and “i” hairs may be seen in alopecia areata and trichotillomania [Figure 4].

### Horse-shoe hairs

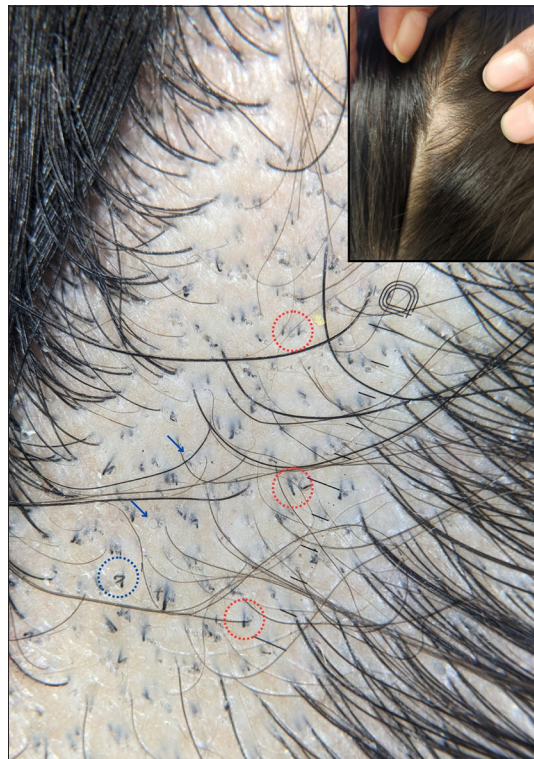
It has been reported as a novel finding associated with endothrix infections and is considered to be a variant of comma-hair. These are U-shaped hairs with arms of equal length resembling a horse-shoe<sup>[14]</sup> [Figures 2 and 4].

### Pigtail hairs

These are short-curved vellus hairs, formed from regrowing hairs found in lower frequencies in patients with TC. These have also been reported with alopecia areata<sup>[11]</sup> [Figure 4].

### Perifollicular and diffuse scaling

Common findings in TC are seen more commonly with ectothrix infections<sup>[7]</sup> [Figure 3]. Several studies have concurred that TC should not be diagnosed on the basis of a single trichoscopic finding. Brasileiro *et al.* observed that a combination of six trichoscopic features (broken, black-dot, comma, corkscrew, and zigzag hair in combination with perifollicular scaling) was essential to making the diagnosis.<sup>[16]</sup> Another Indian study concluded that four features (short-broken hair, black-dot, comma-hair, and perifollicular scaling) are sufficient for diagnosing with a 98.97% sensitivity.<sup>[14]</sup>



**Figure 4:** Trichoscopy showing i-hairs (red circles), pigtail hairs (blue arrows), and horse-shoe hair (blue circle). The inset shows the clinical image of the same patient ( $\times 20$ , DermLite DL5, polarized, contact, dry).

Trichoscopy helps in differentiating between the causative organisms. *Microsporum* spp. causing ectothrix frequently shows Morse-code such as hairs, zigzag hairs, bent hairs, and diffuse scaling, whereas corkscrew and comma-hairs are more commonly observed with endothrix infections caused by *Trichophyton* spp.<sup>[8,14]</sup> A recent study correlating trichoscopic findings with mycological culture reports found that features such as corkscrew and comma hairs had 94.9% specificity and 96.4% positive predictive value for *Trichophyton tonsurans* infection, whereas, Morse-code and zigzag hairs had 85.4% specificity and 65.3% positive predictive value for *M. canis* infection. The identification of the dermatophyte species is important from a therapeutic perspective.<sup>[17]</sup> Griseofulvin is recommended for *Microsporum* spp. while terbinafine is considered first-line for *Trichophyton* infections.<sup>[18]</sup> Furthermore, trichoscopy has been utilized for monitoring treatment efficacy. Dystrophic hair signs such as comma hairs, corkscrew hairs, Morse-code-like hairs, and black dots are the first to disappear within four weeks of initiating treatment. In contrast, perifollicular and diffuse scaling take longer to resolve, persisting until around 12 weeks of therapy.<sup>[19,20]</sup>

## CONCLUSION

Trichoscopy is a validated and easy-to-perform bedside tool for the accurate diagnosis of TC. The knowledge of the specific trichoscopic signs helps in the initial diagnosis and timely initiation of correct treatment, often eliminating the need for direct microscopy or fungal culture.

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